Dimension of Fully Integrated Delivery Team for Malaysian Industrialised Building System (IBS) Construction Projects

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Abstract

Problems associated with fragmentation in the traditional construction process, such as isolation of professionals, lack of co-ordination between design and construction, and the sequential manner of its processes, has impacted on construction performance leading to a lack of integration, wastage, low productivity and inefficiency. Team integration is perceived as paramount. Unfortunately, there are limited numbers of studies that focus on the dimension of fully integrated team, especially for Malaysian IBS projects. Accordingly, this paper explores and identifies the dimension of fully integrated team from the traditional approach and conducts a validation process for implementing it in Malaysian IBS projects. The research presented uses interviews case study to obtain qualitative data. It was found that the dimension of fully integrated team from the traditional construction process could apply to the Malaysian IBS projects.

Keywords: Industrialised building system (IBS); Malaysian construction industry; dimension of fully integrated team

1. Introduction

As Malaysia is witnessing rapid development, the construction industry has been encouraged to shift from the conventional practice towards industrialised approach. Although Industrialised Building System (IBS) has a solution towards improving constructions sustainability however implementation of this system faces a lot of barriers like lack of integration among stakeholders during design stage in project life cycle. Therefore, 'integrated project team' has been identified as one of the appropriate approaches that can provide an effective framework for integrating in order to overcome that problem (Nawi et al., 2012, CIDB, 2009). An integrated delivery team is highly effective to bring together various skills and knowledge that removes the traditional barriers towards an effective and efficient delivery of the project (Baiden et al., 2006; Achieving Excellence in Construction, 2003; Akintoye, 1994; Fleming and Koppelman, 1996). For example, involvement of IBS's specialty contractors or manufacturers early in the design process will help design professionals to see how a contractor will implement the design. This strategy indirectly hinders the result in scheduling problems, delays and disputes during the construction process, and, hence, harms the overall project performance (Nawi et al. 2011; Baiden et al., 2006).

Based on the literature review from the previous studies (Love et al., 2004; Anumba et al., 2002; Baiden et al., 2003; Bromley et al., 2003; Cornick and Mather, 1999; Dainty et al., 2001; Evbuomwan and Anumba, 1998; Love and Gunasekaran, 1998; Moore and Dainty, 1999; Strategic Forum for Construction, 2003; and Vyse, 2001) it has been identified that the delivery team on a construction project can be described as 'fully integrated' when it;

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- has a single focus and objectives for the project
- operates without boundaries among the various organization members and works towards mutually beneficial outcomes
- shares information freely among its members such that access is not restricted to specific professions and organisational units within the team
- has a new identity and is co-located, usually in a given common space
- operates in an atmosphere where relationships are equitable, offers its members equal opportunities to contribute to the delivery process and all members are respected
- has a "no blame", culture

Due to validity and practicality of data, Bell (1991) warned that secondary data has the disadvantage of becoming out-of-date, as well as not being appropriate for the precise needs of a particular research problem. Mohammad (2011) also claimed that secondary data by itself cannot meet the specific needs of particular situations, problems or settings, and it is essential to obtain primary data to overcome this shortcoming. In view of that, this type of research is generated to gather the primary data and also to validate all the dimensions that have been identified, in general, to see if they could be applied for Malaysian IBS industry or not.

2. Research Methodology

The data was obtained from a case study organized by researchers. A number of interviews with three officers from different job functions (top level of management, operational, and technical department) were conducted in validating the dimension of integrated project team in construction. The main selection criteria for inviting the survey participants to the interview session is to have at least 5 years of working experience in IBS related projects. Robson (2002) defines case study as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence (quoted from Saunders *et al.,* 2007). Many researcher (i.e. Yin, 2007; Nawi et al., 2012; Kamar, 2011) clearly agree that interview is one of the establish tool or technique for qualitative data collection especially for the research that involves case study as a research design.

For the purpose of this study, the interviews were conducted two times at two difference venues. The first interview was conducted with managing director and design engineer of the company in the headquarter office meeting room. The second interviews were conducted with operation manager in the site office meeting room. Due to the need to maintain confidentiality and anonymity, the interviewees' names are not revealed. Therefore, prefix codes listed-in Table 1 were used. Both of the interviews session used structured and semi structured questionnaires focusing on validation of dimension of fully integrated team delivery in the Malaysian IBS project. The results of the interviews are presented in Table 2 below.

Table 1; Interview quotation code prefixes details

Interviewee ID	**Code Prefix**
Managing Director	RCS-01-01
Operation Manager	RCS-01-02
Senior Design Engineer	RCS-01-03

3. Result and Discussion

Based on the findings from the case study, it was confirmed that the entire dimension obtained from the literature review are necessary to be applied in IBS projects in order to achieve a fully integrated team delivery. The findings below show all the recommendations discussed during the case study interviews.

Table 2: Summary of recommendations from the Validation Case Study

Dimension	Recommendation
Single focus and objectives	Each of the team members is responsible for the progress and performance of the project from beginning until the completion of the project. They must have a feel of 'sense of ownership' when doing the job thus putting extra effort that goes beyond their routine of duty. Most of the respondents agreed that this factor is essential for the success of integrated design team delivery. *'In the beginning of a project, we always practice that all the project team members understand their duty and responsibility of the project to avoid duplication of job and wastage'* – ***Managing Director*** *'In the current practice, we need to update the progress of work through the monthly meeting with design manager in order to avoid something bad happened in the future'* – ***Senior Design Engineer*** *'As a leader, we make sure that we create a single goal of direction especially to fulfil the client's requirement. At the same time, we make sure all members clearly understand the project's vision and mission' in the delivery of project* - ***Managing Director***
Operates without boundaries	'Operational' in this study refers to a process or series of actions such as has an interaction space, co-located of team, non operational boundary, collaborative, and teamwork supportive of climate. According to respondents, these entire components are very important thus indirectly will improve team culture and attitude among professional disciplines towards successful integrated team. *'We always think about transportation issues during the design phase to avoid problems happened during the transportation or delivery process. All the information is discussed with design team during consultant meeting or walk in to consultant firm'* – ***Operation Manager*** *'Normally, we spend around 3 month for design process. At the same time, the substructure work is started to reduce the time of constructions. However, the time period of design stage should be longer than in the current practice to produce best quality of design'* – ***Senior Design Engineer***
Shares information freely	The respondents mostly agreed that technology plays as a medium or appropriate mechanism to co-ordinate activity, enhance interaction and knowledge sharing within a project team. In this project, technology is needed to support team communication due to temporal and departmental constraints. *'IT is an important tool to visualize drawing and improve communication during IBS design process. Currently we move to 3D instead of 2D drawings for designers and manufacturers having better view and understanding of detail IBS components'* – ***Managing Director*** *'Technology visualization is the key to coordinate and enhance interaction during the design and manufacture stage. It requires avoiding any mistake and failure during design process particularly in the technical drawing'* – ***Operation Manager*** *'AutoCAD, Esteem, Staad Pro 2005, Orion and Tekla are among the software that we always use during the IBS design processes'* – ***Senior Design Engineer***
New identity and co-location	The integrated design team delivery was set up to maintain central control of the various organizations. This team is usually given a common space operates in an atmosphere where relationships are equitable and members are respected. This approach brought all the functional expertise that is required for the project together to act within a single entity with working collaboratively rather than individuals. Therefore all the team members could be able to respond to

	change over the duration of the project. The interviewees agreed that this approach is significantly affective for improving integration team practice. *'The current team structure makes it easier to manage the various consultants and other parties who are involved in the design of the project effectively. It's also easier to ensure that all issues related to design such as manufacturability and constructability are dealt earlier in the beginning of project'* – ***Managing Director*** *'Flexibility and balance of process between factory and site is critical. For example, when works at site are stopped, casting at factory shall also stop. Therefore, the concept of early involvement and fully utilization of collective skills and expertise from the both sides during the design stage is very important; especially to prevent double handling and problems with storage'* – ***Operation Manager*** *'We will make sure that all of our design engineers are qualified, recognized and registered with the professional body such as board of engineers Malaysia etc' in order to avoid any bad things happening in the future* – ***Managing Director*** *'I think the production and construction issues must be incorporated earlier during the design stage in order to ensure smooth project sequences and error-free of construction'* – ***Senior Design Manager***
No 'blame each other' culture	Transparency in this study refers to the commitment of open, frequent and genuine communication among team members in a construction project. Respondents agreed that this transparency communication will create a good collaborative working environment such as resolution of disagreement without confrontation among team's members. *'We try our best to create the necessary environment for all members of the delivery team to know each other through social functions and family activity'* - ***Managing Director*** *'Normally, we will use the weekly meeting to solve our problems. Meeting is an appropriate medium for everybody to declare their problem and it is very effective to avoid confrontation or miscommunication among members at site'* – ***Operation Manager*** *'We have been working on this project for long time and I do believe the relationships that exist among us are good at all levels. Every member is respected among each other and there has no blame culture in our team'* – ***Senior Design Engineer***

Based on the findings identified from the case study, all the dimension factors are significant to be implemented in the Malaysian IBS projects except work in relationship environment. On the other hand, the respondents also suggested that some other dimensions also need to be added in order to enhance the efficiency of integrated team project delivery. For example, the respondent recommended that personal attitude, policy and leadership are among the extra dimension that should be considered for a team to excel as fully integrated team in Malaysian IBS projects. All the recommendations are highlighted as below:

- **Excellent personal working attitude**

This factor that represents an individual's degree of 'like or dislike' for work has been identified critical by all the respondents in order to achieve fully integrated team in construction project. All the respondents agreed that "doing what you love" in routine work can create a powerful motivator of group performance including commitment, continuity and positive self improvement.

> *'My style is so simple to train and approach our staff. Firstly, know their expertise; give the appropriate job and allocate a flexibility of time to complete the task. Sure they will be happy and enjoy their current job'* – ***Managing Director***
>
> *'Personally I think 'openness of thinking' is the key for the team to be excellent and work in collaborative manner'* - ***Operation Manager***

'A few of our engineers are fresh but they are very committed and willing to learn that something new especially related to technology or software. As a senior staff, we are also happy to teach and share our knowledge and skills together' – ***Senior Design Engineer***

- **Policy**

Respondent consents that the government policy has been noted as one of the key influences in promoting a new technique or product in the Malaysian construction industry. According to them, this is simply because the government is one of the biggest clients for the IBS construction projects in Malaysia. This policy typically will affect the delivery of a construction project either in term of process or team structure.

'Our company's vision is always aligned with the government policy in order to gain some benefits of practice such as reduction of levy, tax etc.' – ***Operation Manager***

- **Leadership**

Management of leadership has been validated by the respondents as critical factor to ensure that the vision and strategy of a team is communicated effectively to all members. The support from top management and all senior managers in terms of sponsorship, training, commitment and empowerment are essential towards successful integrated team delivery. The competency of team members is part of the fundamental key success to IBS integrated design team.

'Training scheme is part of the continuous improvement process in our organization of project. This process is the fundamental success for integrated design team through the development of staff competency'– ***Managing Director***

'Company provides continuous education and training activities such as hands-on and on-the-job labour training, particularly in technical part such as installation and jointing panel systems' – ***Operation Manager***

4. Conclusion

Although, a list of dimension for fully integrated teams have been identified to become the core elements for the development of a framework for effective integrated design team delivery in Malaysian IBS projects, unfortunately, the findings of the dimension are based on the traditional construction process as a general. The specific dimensions of fully integrated team that relate to the IBS Malaysian construction industry are still limited. Therefore, this research conducted a validation process through a case study interviews with Malaysian industry players in order to transform the lesson learnt from the traditional practice to IBS. The findings from this study show almost all the dimensions identified from the previous studies are significant and to be applied towards fully integrated team except the factor of 'work in relationship environment.' For the recommendation of future study improvement, a few more similar studies need to be done in order to support this dimension as a core element for developing a framework for effective integrated design team delivery in Malaysian IBS projects.

Acknowledgements

The authors gratefully acknowledge the support by the Ministry of Education Malaysia for providing the funding under Research Acculturation Grant Scheme (RAGS) and Universiti Utara Malaysia (UUM).

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